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10/569,002	02/15/2006	Mitsuhiro Kashiwabara	3712174.00518	1753

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EXAMINER	
HOLLWEG, THOMAS A	

ART UNIT	PAPER NUMBER
2879	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

chicago.patents@klgates.com

Office Action Summary	Application No.	Applicant(s)	
	10/569,002	KASHIWABARA, MITSUHIRO	
	Examiner	Art Unit	
	Thomas A. Hollweg	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 July 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11,12,14-18 and 20-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11,12,14-18 and 20-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Acknowledgment of Amendment

1. Applicant's amendment, of July 1, 2010, is acknowledged. No claims are added or canceled. Claims 11, 12, 14-18 and 20-23 currently pending.

2. The amendment to claim 20 is acknowledged. The previous objection to claim 20 is withdrawn.

Claim Objections

3. The listed claims are objected to for the following informalities:

a. Claim 20, line 15, "the hole transfer layer" lacks antecedent basis. This layer is understood to be "the hole transport layer".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 11, 12, 15, 17, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al., U.S. Patent Application Publication No. 2004/0032214 A1, in view of Seo et al., U.S. Patent Application Publication No. 2002/0113546 A1**

6. **With regard to claim 11,** in figures 4B-D, Lee discloses an organic EL device comprising: a plurality of light emitting layers (44, 49, 50) including a red light emitting layer (50), a green light emitting layer (49), and a blue light emitting layer (44) laminated

between an anode (41) and a cathode (48); and an intermediate layer (45) comprised of an organic material is provided in at least one location between said light emitting layers (44, 49, 50); said intermediate layer (45) having an electron blocking property and a hole transporting property (α-NPD) [0031-0037].

7. Lee does not expressly disclose that the green light emitting layer comprises a hole transporting material and an electron transporting material.

8. Seo, in figure 7, teaches an organic EL device having a red (508), a green (507), and a blue (505) light emitting layer laminated between an anode (501) and a cathode (503) where the green light emitting layer (507) comprises a hole transporting material (α-NPD) and an electron transporting material (DPVBi) [0142-0146].

9. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Lee device where the green light emitting layer comprises a hole transporting material and an electron transporting material, as taught by Seo, as an alternative to the single material green light emitting layer disclosed by Lee. A mix of α-NPD and DPVBi with a green dopant would be an especially suitable choice for the green light emitting layer of Lee because, the green light emitting layer is required to both donate holes to the red light emitting layer and donate electrons to the blue light emitting layer. Also, α-NPD and DPVBi are already present in the device in the intermediate layer and the blue light emitting layer, respectively.

10. **With regard to claim 12,** in figures 4B-D, Lee discloses that a HOMO-LUMO energy gap of the intermediate layer (45) is greater than a HOMO-LUMO energy gap of at least one material constituting the light emitting layers (44, 49, 50) disposed adjacent

to the intermediate layer (45) (energy gap property is inherent to the materials discloses) [0031-0037].

11. **With regard to claim 15,** in figures 4B-D, Lee discloses that a LUMO energy level of the intermediate layer (45) having a hole transporting property is higher than a LUMO energy level of an electron transporting component in the green light emitting layer (49) (properties inherent to the materials disclosed) [0031-0037].

12. **With regard to claim 17,** in figures 4B-D, Lee discloses that the LUMO energy level of the intermediate layer (45) having an hole transporting property is higher than the LUMO energy level of an electron transporting component in the red light emitting layer (50) (properties inherent to the materials disclosed) [0031-0037].

13. **With regard to claim 22,** in figures 4B-D, Lee discloses that the HOMO-LUMO energy gap of the intermediate layer (45) is greater than a HOMO-LUMO energy gap of all the materials constituting the light emitting layers (44, 49, 50) adjacent to the intermediate layer (45) [0031-0037].

14. **With regard to claim 23,** in figures 4B-D, Lee discloses an organic EL device comprising: a plurality of light emitting layers (44, 49, 50) including a red light emitting layer (50), a green light emitting layer (49), and a blue light emitting layer (44) laminated between an anode (41) and a cathode (48); and an intermediate layer (45) comprised of an organic material is provided in at least one location between said light emitting layers (44, 49, 50) [0031-0037]; said intermediate layer (45) having an electron transporting property and a hole blocking property (BCP) [0033].

15. Lee does not expressly disclose that the green light emitting layer comprises a hole transporting material and an electron transporting material.

16. Seo, in figure 7, teaches an organic EL device having a red (508), a green (507), and a blue (505) light emitting layer laminated between an anode (501) and a cathode (503) where the green light emitting layer (507) comprises a hole transporting material (α-NPD) and an electron transporting material (DPVBi) [0142-0146].

17. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Lee device where the green light emitting layer comprises a hole transporting material and an electron transporting material, as taught by Seo, as an alternative to the single material green light emitting layer disclosed by Lee. A mix of α-NPD and DPVBi with a green dopant would be an especially suitable choice for the green light emitting layer of Lee because, the green light emitting layer is required to both donate holes to the red light emitting layer and donate electrons to the blue light emitting layer. Also, α-NPD and DPVBi are already present in the device in the intermediate layer and the blue light emitting layer, respectively.

18. **Claims 14, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee and Seo, as applied to claim 11, further in view of Yamazaki et al., U.S. Patent Application Publication No. 2004/0012331 A1.**

19. **With regard to claim 14,** in figures 4B-D, Lee discloses that the intermediate layer (45) is provided at least between the green light emitting layer (49) and the blue light emitting layer (44) [0031-0037].

20. In the Lee device the intermediate layer would not restrict the injection of electrons into the green light emitting layer and promote the injection of holes into the blue light emitting layer because of the laminated order of the light emitting layers.

21. Yamazaki, in figure 1A, teaches an organic EL device having a plurality of light emitting layers (12a-c) that may be selected to generate white light by doping polymer materials with pigments [0052-0063]. One having ordinary skill in the art would understand that white light may be generated by doping the layers to emit red, green and blue light, and the order of the emission layers and the direction of emission are both matters of design choice.

22. Based in the teaching of Yamazaki, at the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Lee device where the blue light emitting layer was on the cathode side of the green light emitting layer and the intermediate layer would restrict the injection of electrons into the green light emitting layer and promote the injection of holes into the blue light emitting layer, because according to Yamazaki, the order of the light emitting layers is a matter of design choice.

23. **With regard to claim 16,** in figures 4B-D, Lee discloses that the intermediate layer (45) is provided at least between the red light emitting layer (50) and the green light emitting layer (49) [0031-0037].

24. In the Lee device the intermediate layer would not restrict the injection of electrons into the red light emitting layer and promote the injection of holes into the green light emitting layer because of the laminated order of the light emitting layers.

25. Yamazaki, in figure 1A, teaches an organic EL device having a plurality of light emitting layers (12a-c) that may be selected to generate white light by doping polymer materials with pigments [0052-0063]. One having ordinary skill in the art would understand that white light may be generated by doping the layers to emit red, green and blue light, and the order of the emission layers and the direction of emission are both matters of design choice.

26. Based in the teaching of Yamazaki, at the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Lee device where the green light emitting layer was on the cathode side of the red light emitting layer and the intermediate layer would restrict the injection of electrons into the red light emitting layer and promote the injection of holes into the green light emitting layer, because according to Yamazaki, the order of the light emitting layers is a matter of design choice.

27. **With regard to claim 18,** in figures 4B-D, Lee discloses a display comprising: a plurality of light emitting layers (44, 49, 50) including a red light emitting layer (50), a green light emitting layer (49), and a blue light emitting layer (44) laminated between an anode (41) and a cathode (48); and an intermediate layer (45) comprised of an organic material is provided in at least one location between said light emitting layers (44, 49, 50); said intermediate layer (45) having an electron blocking property and a hole transporting property (α-NPD) [0031-0037].

28. Lee does not expressly disclose **1)** a color filter on the light take-out surface, **2)** that the green light emitting layer comprises a hole transporting material and an electron

transporting material, or **3)** that the intermediate layer restricts the injection of electrons into the green light emitting layer and promotes the injection of holes into the blue light emitting layer because of the laminated order of the light emitting layers.

29. **1)** Yamazaki teaches an organic EL device with a color filter on the light take-out surface side [0061].

30. **2)** Seo, in figure 7, teaches an organic EL device having a red (508), a green (507), and a blue (505) light emitting layer laminated between an anode (501) and a cathode (503) where the green light emitting layer (507) comprises a hole transporting material (α-NPD) and an electron transporting material (DPVBi) [0142-0146].

31. **3)** Yamazaki, in figure 1A, teaches an organic EL device having a plurality of light emitting layers (12a-c) that may be selected to generate white light by doping polymer materials with pigments [0052-0063]. One having ordinary skill in the art would understand that white light may be generated by doping the layers to emit red, green and blue light, and the order of the emission layers and the direction of emission are both matters of design choice.

32. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Lee device where **1)** a color filter is disposed on the light take-out surface, as taught by Yamazaki, so that red, green and blue light may be selectively emitted, and **2)** where the green light emitting layer comprises a hole transporting material and an electron transporting material, as taught by Seo, as an alternative to the single material green light emitting layer disclosed by Lee. A mix of α-NPD and DPVBi with a green dopant would be an especially suitable choice for the

green light emitting layer of Lee because, the green light emitting layer is required to both donate holes to the red light emitting layer and donate electrons to the blue light emitting layer. Also, α-NPD and DPVBi are already present in the device in the intermediate layer and the blue light emitting layer, respectively.

33. Further, based in the teaching of Yamazaki, at the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Lee device where **3)** the blue light emitting layer was on the cathode side of the green light emitting layer and the intermediate layer would restrict the injection of electrons into the green light emitting layer and promote the injection of holes into the blue light emitting layer, because according to Yamazaki, the order of the light emitting layers is a matter of design choice.

34. **Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murazaki et al., JP 2003-229265, in view of Lee, Seo and Yamazaki. An English language translation of JP 2003-229265, relied upon for the following rejection, is attached to this Office Action.**

35. **With regard to claim 20,** in figure 2, Murazaki discloses an organic EL device comprising: an anode (15); a hole transport layer (17) a plurality of light emitting layers (18) including a red light emitting layer (18a), a green light emitting layer (18c), and a blue light emitting layer (18b) laminated on the hole transport layer (17) such that the red light emitting layer (18a) is formed in contact with the hole transport layer (17); an electron transport layer (19) formed on the blue light emitting layer (18b); a cathode (21) formed on the electron transport layer (19); wherein the red light emitting layer (18a) is

configured so that a portion of the holes injected through the hole transport layer are re-coupled in the red light emitting layer (18a) and give red light emission and a remainder of the holes are transported into the green light emitting layer (18c) [0021-0026].

36. Murazaki does not expressly disclose **1)** that the blue light emitting layer is on the cathode side of the green light emitting layer, **2)** an intermediate layer, or **3)** that the green light emission layer comprises a hole transporting material and an electron transporting material.

37. **1)** Yamazaki, in figure 1A, teaches an organic EL device having a plurality of light emitting layers (12a-c) that may be selected to generate white light by doping polymer materials with pigments [0052-0063]. One having ordinary skill in the art would understand that white light may be generated by doping the layers to emit red, green and blue light, and the order of the emission layers and the direction of emission are both matters of design choice.

38. **2)** Lee, in figures 4B-D, teaches an organic EL device comprising: a plurality of light emitting layers (44, 49, 50) including a red light emitting layer (50), a green light emitting layer (49), and a blue light emitting layer (44) laminated between an anode (41) and a cathode (48); and an intermediate layer (45) comprised of an organic material is provided in at least one location between said light emitting layers (44, 49, 50) [0031-0037]; said intermediate layer (45) having an electron blocking property and a hole transporting property (α-NPD) [0033], to control the flow of electrons and holes.

39. **3)** Seo, in figure 7, teaches an organic EL device having a red (508), a green (507), and a blue (505) light emitting layer laminated between an anode (501) and a

cathode (503) where the green light emitting layer (507) comprises a hole transporting material (α-NPD) and an electron transporting material (DPVBi) [0142-0146].

40. Based in the teaching of Yamazaki, at the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Murazaki device where **1)** the blue light emitting layer was on the cathode side of the green light emitting layer, because the order of the light emitting layers is a matter of design choice.

41. Further, at the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Murazaki device **2)** having an intermediate layer between the blue light emitting layer and the green light emitting layer, the intermediate layer having an electron blocking property and a hole transporting property, as taught by Lee, to restrict the injection of electrons into the green light emitting layer and promote the injection of holes into the blue light emitting layer, and **3)** where the green light emitting layer comprises a hole transporting material and an electron transporting material, as taught by Seo, as an alternative to the single material green light emitting layer disclosed by Murazaki. When the green light emitting layer is between the red light emitting layer and blue light emitting layer **(**Murazaki device modified by Yamazaki) the green light emitting layer is required to both donate holes to the red light emitting layer and donate electrons to the blue light emitting layer, therefore having both hole and electron transporting materials in the green light emitting layer improves efficiency.

42. **Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee, Seo and Yamazaki, as applied to claims 11 and 16 above, in further view of D'Andrade et al., U.S. Patent Application Publication No. 2002/0197511 A1.**

43. **With regard to claim 21,** all of the limitations are disclosed by Lee, Seo and Yamazaki, as discussed in the rejection of claims 11 and 16 above, except they do not expressly disclose that the organic material for the intermediate layer includes at least one of TPD and CBP. Lee discloses that appropriate materials for the intermediate layer include those with hole transport and electron blocking properties such as α-NPD [0033].

44. D'Andrade teaches that in addition to α-NPD, TPD and CBP are ideal materials with hole transport and electron blocking properties [0044].

45. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Lee, Seo and Yamazaki device described in the rejection of claim 16 above, where the organic material for the intermediate layer includes at least one of TPD and CBP, because these materials have hole transport and electron blocking properties, as taught by D'Andrade, and they would control the stream of electrons so that the device may emit excellent white light (Lee [0023]).

Response to Arguments

46. Applicant's arguments have been considered, but are moot in view of the new grounds for rejection.

Conclusion

47. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

48. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

49. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas A. Hollweg whose telephone number is (571) 270-1739. The examiner can normally be reached on Monday through Friday 7:30am-5:00pm E.S.T..

50. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

51. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TH/

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Supervisory Patent Examiner, Art Unit 2879